Metabolomic profiling of antimalarial medicinal plants and phytomedicines from Burkina Faso

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Introduction

Traditional medicine is an important part of the health care system in African countries. However, scientific evidence from tests done to evaluate safety and efficacy of traditional medicine products and practices is limited [1]. In this study two antimalarial phytomedicines, N’dribala (Cochlospermum planchonii, Cochlospermaceae), Saye (C. planchonii and Phyllanthus amarus, Phyllanthaceae) and Argemone mexicana, Papaveraceae [2, 3] were investigated by metabolomics profiling for quality control methods development. Different solvent partitions were prepared for a comparative metabolomics profiling using TLC and HPLC-DAD.

Results & Discussion

In N’dribala, cochloxanthine/ dihydrocochloxanthine (26.42 min / 26.68 min) were identified by HPLC at 400 nm as main absorbing compounds in the dichloromethane fraction, with 4 cochloxanthine derivatives. Ellagic acid, gallic acid and 3 ellagic acid derivatives were identified at 254 nm in the ethyl acetate fraction. The HPLC analysis of the ethyl acetate fraction of saye allowed characterizing at 254 nm ellagic acid (19.62 min) as main absorbing compound, Kaempferol at 25.15 min and ellagic acid derivatives at 18.50 min and 20.63 min. Cochloxanthine / dihydrocochloxanthine were identified at 400 nm in the dichloromethane fraction (26.42 min / 26.68 min).

The HPLC analysis of the dichloromethane fraction of A. mexicana allowed identifying berberine (16.62 min) as main absorbing compound at 254 nm and rutin (19.08 min) in the ethyl acetate fraction. P-coumaric, ferulic and caffeic acids were characterized at 320 nm in both ethyl acetate and dichloromethane fractions. Unidentified flavonoids were mainly visible in the water fraction at 320 nm.

According to the phytomedicine samples studied, ellagic acid, cochloxanthine/ dihydrocochloxanthine, and berberin are good candidates to be targeted as markers for saye, N’dribala and Argemone mexicana, respectively.

Material & Methods

The phytomedicines N’dribala (3) and Saye (3) samples were from PhytoFla (Banfora, Burkina Faso), and A. mexicana was collected in the Western region of Burkina Faso. The plant material was extracted with 80% methanol overnight and the methanol was removed from the extract using a rotavapor. The remaining extract was used for liquid-liquid partitions to get CH₂Cl₂, ethyl acetate and water fractions successively, which were used for TLC (Ethyl acetate/methanol/H₂O, 77/13/10), HPLC (H₃PO₄ 0.1% and methanol as solvents). The identified compounds were characterized by using the respective standard compound for all of them except the cochloxanthines for which bibliographic data were used [4].